PROGRESS REPORTS

FROM

EXPERIMENT STATIONS

SEASON 1958-59

KENYA

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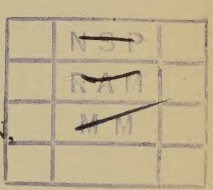
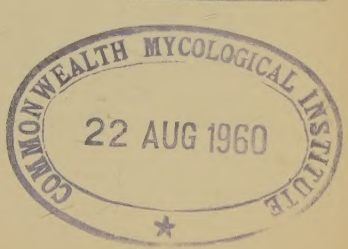




E.C.G.C. STAFF

The Cotton Research Officer, Mr. M. S. Hastie, B.Sc., is a member of the Corporation's staff who works in liaison with the Cotton Research Station, Namulonge, Uganda. By agreement with the Kenya Government, he carries out cotton experiments at the Cotton Lint and Seed Marketing Board experiment station at Kibos (where he is stationed), with sub-stations at Homa Bay and Busia.

KENYA

NYANZA PROVINCE

PROGRESS REPORT FOR THE SEASON 1958-59

BY

M. S. HASTIE

	Cotton	*Food crops*
Sowing	March-September	February-March
Flowering	June-November	
Reaping	September-March	July

General

Among the many visitors to the Cotton Experiment Station, Kibos, during the season were Mr. D. F. Ruston, then Secretary of the Empire Cotton Growing Corporation, Mr. A. C. C. Swann, Provincial Commissioner of Nyanza, and Mr. B. C. Wills, Acting Deputy Director of Agriculture.

Mr. M. S. Hastie went on overseas leave in July 1958 and returned in September. Mr. T. J. Crowe left to take up duties as Entomologist at the Coffee Research Station, Ruiru, in September and was replaced by Mr. A. Davidson.

Mr. Hastie visited the Coast Province cotton areas, the European farming area suitable for cotton around Kampi-ya-moto, and the Corporation's Cotton Research Station at Namulonge, Uganda. He also attended the Coast Province Experiments Meeting, held this year in Nairobi.

Table 1

Meteorology

	Kibos				Homa Bay	Busia
1958	*Rainfall ins.*	*Temperature °F. max.*	*min.*	*Hours sunshine*	*Rainfall ins.*	*Rainfall ins.*
January	0·30 (2)	90·4	61·1		1·54 (5)	0·55 (6)
February	4·50 (10)	88·4	60·8		4·99 (5)	4·50 (10)
March	5·86 (12)	88·2	61·7	7·53	3·97 (8)	2·65 (11)
April	8·14 (15)	89·5	62·4	7·25	12·21 (13)	6·50 (18)
May	5·29 (18)	84·3	61·6	7·78	5·59 (13)	8·13 (22)
June	4·56 (17)	82·0	60·2	6·90	4·12 (9)	4·84 (14)
July	4·73 (13)	81·0	60·7	6·40	1·99 (5)	0·96 (12)
August	3·65 (17)	82·5	60·6	6·97	2·78 (7)	3·84 (18)
September	2·96 (11)	85·1	60·1	7·83	3·18 (8)	4·43 (17)
October	2·65 (17)	87·7	60·6	7·63	5·84 (6)	3·36 (17)
November	0·80 (12)	90·7	59·2	7·85	2·49 (3)	2·38 (11)
December	1·56 (15)	89·0	63·5	7·33	4·47 (11)	3·57 (12)
Totals	45·00(159)				53·17 (93)	45·61(168)
Means		86·6	61·0			

Figures in parentheses represent the number of days on which rain fell.

Rainfall for the year was fairly well distributed and the early-planted cotton in all areas was the most productive. As a result of the dry spell in July, in South and Elgon Nyanza, a considerable part of the crop which would usually be planted during this month was not sown till August and September, particularly in the latter district.

TABLE 2

COTTON ACREAGE AND PRODUCTION

	1957-58			1958-59		
	Acres	*400 lb. bales*	*% B.R.*	*Acres*	*400 lb. bales*	*% B.R.*
South Nyanza	16,000			16,000		
Homa Bay		1,058	12·8		2,565	11·3
Central Nyanza	40,700			40,000		
Kibos		419	30·8		568	26·1
Ndere		1,638	15·2		1,888	13·1
Ukwamba		2,617	11·0		3,330	6·7
Elgon Nyanza	20,460*			24,224**		
Nambare		1,897	9·4		2,638	6·9
Malakisi		1,578	10·6		1,970	6·7
	77,160	9,207	12·5	80,224	12,959	9·9

* Includes 460 acres in North Nyanza.

**Includes 224 acres in North Nyanza.

The area under cotton in Elgon Nyanza was increased by 20%, with no change in South Nyanza and a slight reduction in Central and North. The increased acreage in Elgon Nyanza occurred mainly in the Nambare ginnery area and was partly responsible for the increased production of about 39% at this ginnery. Early planting in South and Central Nyanza and in the Malakisi area was more in evidence than in the past seasons. Stainer (*Dysdercus* spp.) and bacterial blight (*Xanthomonas malvacearum*) damage was less than in the previous season. This can be seen in the reduced percentage of B.R. (B grade seed cotton roller ginned).

RESULTS OF EXPERIMENTS

Kibos

(1). *Treatment of partially waterlogged land.*—Large tracts of land in the nearby Kano Plain are partially waterlogged during part of the rainy season each year. These wet areas produce very poor crops and are breeding grounds for mosquitoes. With the increase in population, more and more of this type of land will have to be brought into use. The local land tenure system is very complex and it would be difficult to get permission to run drains through peasant holdings not affected by this problem. The use of gypsum and sub-soiling has been successful on local sugar estates, but all these methods are beyond the means of the cotton growers at present.

The area suitable for this trial was restricted and consequently the size of plots and number of replications were smaller than would normally be desired. This experiment was laid down to measure the effect of two types of mulch (maize stover and grass, and rice husks) with and without the addition of sulphate of ammonia at 1 cwt. per acre, applied 4 weeks after planting.

The results are given in Table 3.

TABLE 3

Plot size, 1/60 acre. Randomized blocks. 6 replications. Spacing, 3′ × 2′ at 2 plants per hole. Tied bench ridges.
Planted 9.4.58.

Treatment	*Yield lb. seed cotton/acre*
Untreated	498
1 cwt. sulphate of ammonia/acre	581
Maize stover and grass mulch	561
Maize stover and grass mulch plus 1 cwt. sulphate of ammonia per acre	331
Rice husk mulch	852
Rice husk mulch plus 1 cwt. sulphate of ammonia/acre	644
S.E.	±56·8
L.S.D. 5%	165·5
D.F.	25

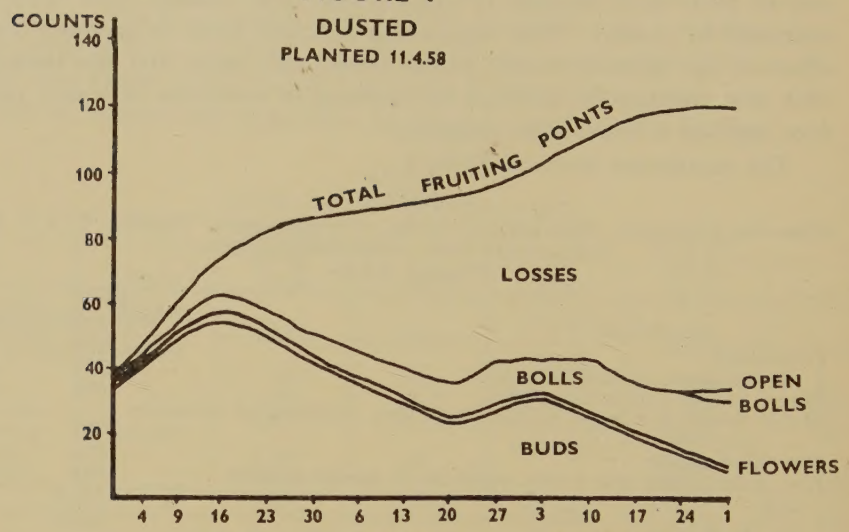
The application of rice husks as a mulch increased yields significantly over all other treatments. The rice husk mulch persisted throughout the season, whereas the mulch of maize stover and grass was soon destroyed by termites. Addition of nitrogen to the mulch led to a significant decrease in yield in both cases.

(2). *Breeding.*—At the beginning of the season it was decided to replace the present S47 in commercial use by DE715/6M. A small quantity of seed of this variety was obtained from Serere in order to start a selection programme to produce a series of small multiline bulks suited to local conditions. New issues of this seed were to be made at the Kano end of the S47 area and moved towards the Uganda border in a succession of waves. The first selections were made during the season but it is not intended to proceed any further, as there has been a revision of policy and the replacement variety may now be successive multiline strains of BP52 produced by the Cotton Research Station, Namulonge, and now being grown in Busoga.

The first small bulk of DE715/6M was grown at the new Prison Farm, Kisumu. An average yield of 1,100 lb. seed cotton per acre was obtained. The crop was dusted with 3:10:0 cotton dust (3% gamma BHC and 10% DDT with kaolin filler) and the success of this measure is largely reflected in the yield. Cotton as a crop will never be successful in Nyanza without protection against insect attack.

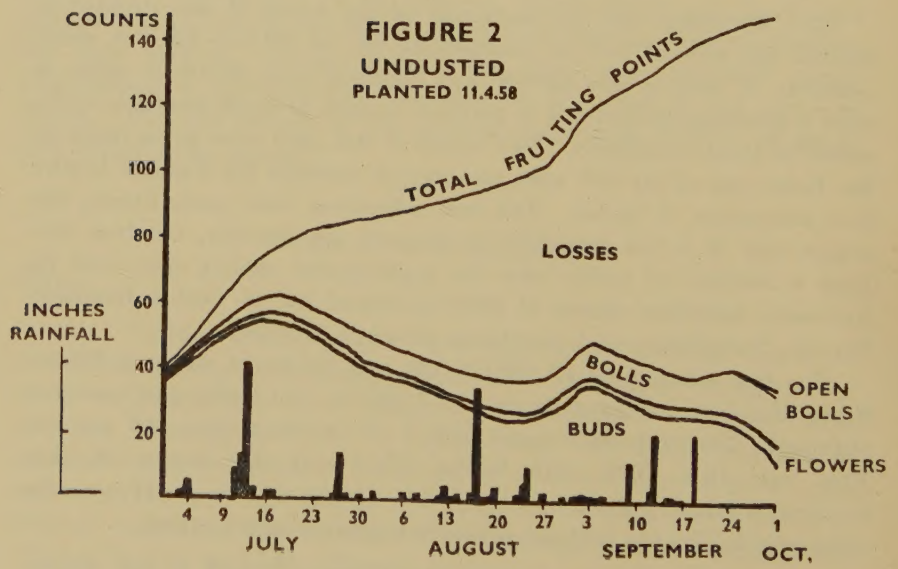
(3). *Plant growth analysis.*—In Figures 1 and 2 are shown diagrammatically sheds and production of buds, flowers, bolls and total

FIGURE 1



DUSTED WITH 3:10:0 COTTON DUST AT 16 LB. PER ACRE PER DUSTING ON 8, 18, 28 AUGUST AND 7, 17 SEPTEMBER

FIGURE 2



fruiting points for protected and unprotected cotton. The principal insect pests are stainers, American bollworm (*Heliothis armigera*) and spiny bollworm (*Earias* sp.).

The protected cotton did not produce as many fruiting points as the unprotected crop, but the survival of bolls and also the proportion of large bolls were greater at the time of maturing of the earliest bolls. The dusted crop was considerably earlier than the undusted and produced a greater yield, although there was little difference in the percentage of stained cotton.

Cotton Sub-station, Busia

(1). *Variety trials.*—Unsprayed variety trials carried out in this area in the past have not been really conclusive and it was felt that a comparison of a protected and an unprotected trial would be useful. Unfortunately the spray material (5% miscible concentrate DDT) was too late in arriving and both trials were consequently unprotected. The principal insect in this area is *Lygus* and the intensity of its attack varies from year to year.

Yields from these trials were extremely low and are given in Table 4.

TABLE 4.

Plot size, 1/60 acre. Randomised blocks. 6 replications. Spacing, 3′ × 2′ at 2 plants per hole. Tied bench ridges. Yield in lb. seed cotton per acre. Planted 15.4.58.

Variety	*Trial 1*	*Trial 2*
S47	203	144
DE715/6M	223	157
Uk51	269	223
Uk55	289	203
S.E.	33·4	21·5
L.S.D. 5%	N.S.	N.S.
D.F.	15	15

The late maturing Uk varieties gave slightly better yields than the early types, but the differences were not statistically significant.

The lower yields in these trials, and in the spacing trials which follow, were the result mainly of *Lygus* attack, and to a lesser extent of bacterial blight.

(2). *Spacing trials.*—As in the foregoing, there were to have been two spacing trials, one protected and the other unprotected, but unfortunately both experiments were unsprayed and a comparison was not possible.

The results are given in Table 5.

TABLE 5

Plot size, 1/57·6 acre after guard rows were removed. Randomized blocks. 6 replications of 5 treatments. Tied bench ridges, row width 3′. Yield in lb. seed cotton per acre.

Planted 15.4.58.

Spacing	*Trial 1*	*Trial 2*
2 plants every 2 ft. in row	182	154
2 plants every 1½ ft. in row	158	216
2 plants every 1 ft. in row	154	192
I plant every 1 ft. in row	182	178
1 plant every 9 in. in row	163	158
S.E.	10·4	27·5
L.S.D. 5%	N.S.	N.S.
D.F.	20	20

The only conclusion which can be drawn from these two trials is that, under the conditions of *Lygus* and bacterial blight attack, giving extremely low yields, spacing had no effect on yield.

District Plots

Date of planting trials were sited at Amukura and Mundika in Elgon Nyanza and at Funyula and Bukangala in Central Nyanza.

The results are given in Table 6.

TABLE 6

Plot size, 1/45·8 acre. 4 × 4 Latin squares. Cultivation on the flat. Spacing, 3′ × 2′, 2 plants/hole. Variety, S47. Yield in lb. seed cotton per acre.

Date of planting	*Elgon Nyanza*		*Central Nyanza*	
	Amukura	*Mundika*	*Funyula*	*Bukangala*
1st April	408	930	1017	932
1st May	340	680	1184	1204
1st June	351	680	620	709
1st July	329	669	584	1527
S.E.	19·6	84·3	43·5	76·1
L.S.D. 5%	N.S.	N.S.	150·7	262·8
D.F.	6	6	6	6

In the Elgon Nyanza plots there were considerable differences in fertility, and *Lygus* and bacterial blight attacks were fairly severe. Differences in yields were not significant at the 5% level.

In Central Nyanza at Funyula the April and May planted cotton significantly outyielded the later plantings, May planting being better than April. At Bukangala, the July planted cotton significantly outyielded that of May, which was better than those of April and June. The success of the July planting can be attributed largely to the well distributed late rains. At both sites the effect of pests and diseases was negligible. Bukangala lies in an area where late rains are usually satisfactory, unlike any other of the Nyanza cotton districts. It is the custom of peasants in this area to plant their cotton in July and August.

Entomology

BY

A. DAVIDSON

(Mr. Davidson took over from Mr. T. J. Crowe as Agricultural Entomologist, Nyanza Province, in September 1958. This report is included by courtesy of the Kenya Government.)

Introduction

Work during the season was confined to field experiments. It will be reviewed under the zonal divisions established by the surveys done in the years 1954-1957.

Luo-Suba (Lake Shore) Zone

Populations of stainers (*Dysdercus* spp.) did not rise above 1,000 adults per acre until mid August at Kibos, but higher populations were reported from South Nyanza. Flared square counts of 3,500 per acre were recorded at Kibos in late July, decreasing thereafter, damage being caused equally by American (*Heliothis armigera*) and spiny (*Earias* spp.) bollworms.

A yield assessment trial was laid down at Kibos, to estimate optimum yield under insect-free conditions. Each boll from selected plots was scored on the number of locules clean. Cotton from all-clean bolls was weighed separately from other clean cotton. Results are expressed in Table 7.

Five-locule bolls, which formed 12% of the total harvest, were found to have more insect damage than four-locule bolls, both in number of bolls and number of locules damaged. This difference was greatest in first and second pickings.

Table 7

Pest assessment trial, Kibos

Variety, S47. Planting date, 2nd April. Layout, selected plots in best growth areas. Replications, 11. Plot size, 3′ × 66′. Spray, 0·125% DDT + 0·03% BHC to runoff every 7 days from 23rd July to 17th September.

Weight of clean locules from all-clean boll	0·04512 oz.
Weight of clean locules from partly stained boll	0·04165 oz.
Actual yield/acre clean cotton	1,812 lb.
Actual yield/acre stained cotton	460 lb.
Potential yield/acre all-clean cotton	2,807 lb.

An experiment at Kibos on the control of stainers (*Dysdercus* spp.) by confining chickens in cotton gave decreases in the numbers of stainers present in the plots and in the proportion of stained lint, but yield variation with soil fertility in the experimental area obscured any possible yield effects of the treatments. Results are shown in Table 8.

TABLE 8

STAINER CONTROL WITH CHICKENS—KIBOS

Variety, S47. Planting date, 17th March. Layout, randomised blocks. Replications, 4. Plot size, 24′ × 36′.

No. of chickens/acre	*Yield lb. seed cotton per acre*	*% A.R.*
800	1160	53·8
400	1110	47·8
200	1084	47·6
100	933	45·1
50	1047	46·1
0	1173	38·7
S.E.	77·40	2·53

Eighteen replications of a dusting trial were located on peasant holdings throughout the area, testing two dusting rates against a control. Eight gave economic increases from both dust treatments and four gave an economic response to one or other of the rates. Mean data are given in Table 9.

TABLE 9

DISTRICT INSECTICIDE TRIALS—SOUTH AND CENTRAL NYANZA

Variety, Uk51. Planting, April. Layout, randomized blocks on peasant holdings. Replications, 18. Dusting period, 22nd July to 7th September.

Rate of 3% BHC 10% DDT dust	*Yield lb. seed cotton per acre*	*%A.R.*
5 × 16 lb./acre	709	73
5 × 12 lb./acre	683	74
Control	527	56
S.E.	65·6	1·15

Samia Zone

No entomological work was done in this zone.

Elgon Nyanza

On Busia farm a DDT formulation trial using emulsifiable concentrates, wettable powders and dusts showed no significant differences between the formulations. Results are given in Table 10.

TABLE 10

DDT FORMULATION TRIAL, BUSIA

Variety, S47. Planting date, 15th April. Layout, 6 × 6 Latin square. Plot size, 84′ × 24′. Treatment dates, 4th July, 14th July, 27th July, 3rd August.

Lb. DDT/ application/acre	*Gals. water/ application/acre*	*Formulation*	*Yield lb. seed cotton per acre*
1	8	25% emulsifiable concentrate	463
1	12	25% emulsifiable concentrate	383
1	8	50% wettable powder	374
1	12	50% wettable powder	340
1	—	10% dust	288
1½	—	10% dust	414
S.E.			43·2

Trials of standard DDT spray were laid down on peasant holdings in Teso and Luakhakaha areas. Results are given in Table 11. Economic increases from spraying were given by 3 out of 8 blocks in each of the planting months in Teso, and by 7 out of 8 in April-planted, 4 out of 8 in May-planted, and 2 out of 8 in June-planted blocks in Luakhakaha.

TABLE 11

DISTRICT INSECTICIDE TRIALS, ELGON NYANZA

Variety, S47. Layout, randomised blocks on peasant holdings. Replications, 8 to each planting month.

TESO	*Yield lb. seed cotton per acre*			*% A.R. lint*		
Month of planting	*May*	*June*	*July*	*May*	*June*	*July*
4 × 1 lb. DDT in 8 gals. water/acre	837	477	585	76·7	80·5	84·4
Control	646	224	236	70·9	73·5	75·1
LUAKHAKAHA						
Month of planting	*April*	*May*	*June*	*April*	*May*	*June*
4 × 1 lb. DDT in 8 gals. water/acre	637	490	441	73·2	78·6	83·5
Control	292	366	336	77·7	77·3	72·7

Received April 1960.

PROGRESS REPORTS FROM EXPERIMENT STATIONS

The reports for the seasons up to and including 1950-51 were published in seasonal volumes; the following are still in print and available at 3/- per volume post free.

1923-25 (one volume), 1926-1927, 1931-32, 1934-35, 1935-36, 1942-43 and 1945-46 to 1950-51.

From 1951-52 the reports from each territory were published individually each season. A few of the 1951-52 reports are out of print, but all others are available post free at 1/- per report or 7/6d. for the seasonal set.

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